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To: WRSP

14 April 1958

From: R-W,

Info: Headquarters

NOTE: Two enclosures (preflight sheets and parts layout sketch) are not attached to the Headquarters' copy. Please make certain the enclosures are forwarded as attached.

Subject: System 4 Test Data, Serial #103

System 4, Serial #103, has been shipped and a preliminary analysis of the film and tape for the last test flight has been completed. This letter discusses some miscellaneous information that will be helpful in putting the system into operation.

A. On the last test flight of Serial #103, performance was generally very good. The following troubles have been noted and will have to be cured.

1. The 5μsec raster is too dim. We believe that a new CRT should be inserted, and a complete readjustment of indicator unit controls should be made.

2. Digital data levels exhibited a sudden increase during preflight. This may indicate a poor solder joint somewhere in the circuit of Q6703 on the 8A-2 board.

3. The preflight check of Band 1B was normal in all respects. During the mission a portion of the gear train seems to have slipped. This was not noticed in the cursory check of the tape immediately following the flight. The cockpit defroster fan causes continuous noise lock-ons and Band 1B scans through its complete tuning range very slowly. Observing the operation of 1B for several hours by reading out the tape reveals that the digitometer shaft rotation was erratic, sometimes going as high as digit 120 and then returning back to zero and continuing through zero to 377 on down to digit 313. At this point the receiver would begin scanning in the reverse direction. This clearly indicates mechanical slippage in the front end, and the receiver was shipped in this condition.

4. Band 4 exhibited low pulse sensitivity on preflight and then dropped 5 db further by post-flight checkout time. Cause unknown.

5. Some changes were made in the 4030-cycle and the 3040-cycle adding networks on the 8A-2 board. The rasters involved included R6718, R6721, R6722 and R6727. Analysis of the tape reveals that these changes should not have been made. For better readout, please change R6718 back to its original value as indicated on your schematic diagrams.

B. 1. A bound notebook was packed and shipped with System 4, Serial #103. This was a day-to-day record of the field test history of Serial #103. A similar record book will be delivered with each system.

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B. 2. A sketch is attached to the original of this letter that identifies the parts layout of the 100-ohm bias current monitoring resistors according to the recording track number.

3. The coax cable insertion loss between the signal generators and the receivers has been measured by substitution methods. A graph of this insertion loss as a function of frequency is attached to the original of this letter. The cables involved were packed and delivered with the system. Please make cable corrections in all tabulations before recording.

4. A copy of the preflight checks for the last flight test of Serial #103 is attached to the original of this letter.

C. Suggestions.

1. The lock-on sensitivity readings on some bands have been improved by as much as 6 db by eliminating the pinball machine from the preflight test procedures. Instead, the terminal equipment test set is used as the digital indicator, with the jumper plug inserted in the receiver under test. An auxiliary box is being designed to provide slewing control and slewing indication. This unit will be sent to you as soon as it is available.

2. The factory desires to collect information concerning possible CRT performance degradation. Please keep a film clip of the rasters and a record of the corresponding bias settings in the 10 box, both as a function of time. This information will be useful to the field units as well as to the factory.

3. The last two reels of film that were run through the camera had no film breakage. There were two changes in the film mechanism:

a. New film guide clips were built into the film advance mechanism. These clips are installed in Serial #103.

b. The hub sleeve was removed from the supply magazine spindle. Removing the sleeve allows the plastic hub on which the film is wound to fit loosely on the magazine spindle. This is something that was tried during the flight test, and it is not known if this is responsible for the improved performance. The film guide clips alone did not prevent breakage. There has not been a film breakage in the two reels run with the clips installed and the sleeve removed. A complete modification of the film advance mechanism is now almost complete but until you obtain the modified units, you may wish to try these two field modifications.

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C. 4. We suggest that if you find the time you take the following precautions with the recorder.

a. Trim the tuning capacitors on the erase head to secure maximum voltage across the head. You should be able to do this by padding only the 0.01  $\mu$ f capacitor.

b. Adjust the series capacitors on the record heads to give bias currents of 2.5 - 0 + 1 ma. This should be done with the appropriate units of the system connected to all heads.

These two steps should insure more perfect erasure and more uniform playback output. We have no complaints about present performance, but suggest this as a way to achieve an improvement.

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PWA:hcp

Encls with copy 1 only:

1. Sketch
2. CMCC 301X5.4, Cy. 1

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